(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 239 137**
B1

Docket #4803
INV.: P. Dornier et al.

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication of patent specification: **11.04.90**

(51) Int. Cl.[5]: **D 03 D 47/30**

(21) Application number: **87200227.4**

(22) Date of filing: **13.02.87**

(54) **Device for the insertion of weft threads into the shed of air jet looms, and adjustable blowers used thereby.**

(30) Priority: **21.02.86 BE 2060930**

(43) Date of publication of application:
30.09.87 Bulletin 87/40

(45) Publication of the grant of the patent:
11.04.90 Bulletin 90/15

(84) Designated Contracting States:
CH DE ES FR GB IT LI LU NL

(56) References cited:
EP-A-0 023 929
EP-A-0 071 246
FR-A-1 531 853
FR-A-2 364 989

(73) Proprietor: **Picanol N.V.**
Polenlaan 3-7
B-8900 Ieper (BE)

(72) Inventor: **Van Bogaert, Philippe**
Av.E.Cambier 97
B-1030 Schaerbeek (BE)
Inventor: **Bamelis, Jean-Marie**
Rob.Van Buthunelaan 78
B-8900 Ieper (BE)

(74) Representative: **Donné, Eddy**
M.F.J.Bockstael Arenbergstraat 13
B-2000 Anvers (BE)

EP 0 239 137 B1

Courier Press, Leamington Spa, England.

Description

This invention concerns a device for the insertion of weft threads into the shed of air jet looms and also adjustable nozzles which can be used with this device.

It is already known that the insertion parameters of air jet looms can be adapted in accordance with the measurements which are carried out on the weft threads during the insertion into the shed. To this end the variable insertion parameters which are usually applied are the working time and/or the working pressures and/or the air flowing of the nozzles of the weaving loom.

It is already known that, for weaving looms whereby several thread types are used, for instance multicolor machines, the insertion parameters can be modified according to the weaving pattern, in other words that well determine characteristics are applied for each thread type.

The JP—A—59—125—941 has also described a method whereby the flow-though aperture of the main nozzle is automatically adjusted according to various weaving parameters and weaving results. This regulation offers, however, the disadvantage that it is practically impossible to apply it for main nozzles which are moving with the sley because with these very rapidly reciprocating main nozzles a fine and accurate regulation is impossible.

It is already known by the multi-color weaving to supply the weft threads to a main nozzle by means of corresponding auxiliary nozzles. To this end the weft parameters must be adapted in accordance with the various kinds of thread and in accordance with the measurements carried out in the shed whereby a combination can be foreseen with regulation of the main nozzle by means of a regulating system as described in the Patent JP—A—59—125.941. This combination is also disadvantageous because it is hardly applicable because a flow-through aperture of the main nozzle must be instantaneously adapted and sometimes with a relatively large modification for each color and in many cases also for each shot, which is hardly feasible at very high speeds.

The present invention is thus intended to offer a solution to the drawbacks reported hereabove. To this end the invention consists in a device for this insertion of weft threads into the shed of an airjet loom, comprising the combination of a main nozzle and at least one auxiliary nozzle mounted on a stationary part of the loom upstream of the main nozzle, characterised in that the auxiliary nozzle, or at least one of the auxiliary nozzles has an adjustable flow-though aperture and driving means in order to achieve the adjustment of the flow-through aperature, the driving means being controlled by means of a control unit in accordance with an output signal of the latter, whereby the main nozzle is moving or not moving with the sley of the weaving loom.

This installation has the advantage that the insertion parameters can be modified by separate adjustments of the auxiliary, nozzles whereby these are first of all adjusted in accordance with the kind of weaving threads for which they are used and secondly are adjusted in relationship with the measurements which are carried out on their corresponding weft threads during the insertion into the shed. Quite obviously these auxiliary nozzles which are mounted as stationary elements for instance by fastening on the loom frame render possible a precise and very fine adjustment. According to the fact that one auxiliary nozzle is forseen for each kind of weaving thread, the flow-through aperature of these nozzles must not be immediately modified with sudden modification because only complementary adjustement must be carried out.

Another objective of the invention consists in foreseeing nozzles, maybe main nozzles or auxiliary nozzles, whereby the flow-through aperture for the supplied medium can be automatically adjusted by means of driving means.

The characteristics of the invention will be better understood by the examination of the examples hereafter which are given without any limitative meaning whereby a few preferable embodiments are described with reference to the figures in appendix, which are illustrating respectively:

figure 1 a schematic view of the device according to the invention;

figure 2 an adjustable nozzle according to the invention;

figure 3 a cross-section with larger magnification made across line III—III of figure 2;

figure 4 a cross-section through another adjustable nozzle according to invention;

figure 5 a cross-section according to line V—V of figure 4;

figure 6 still another adjustable nozzle according to invention;

figure 7 a cross-section through line VII—VII of figure 6;

figure 8 an alternative solution to figure 4.

Figure 1 gives a preferable embodiment of the device according to the invention whereby two weft threads 1 and 2 must be introduced according to a well determined weaving pattern into the shed 3 of an air jet weaving loom. The device is mainly composed of the combination of a main nozzle 4, of several — in the present case two — auxiliary nozzles 5 located before the main nozzle 4 and which have adjustment possibilities of the flow-through aperture for the supplied medium and driving means, respectively 7 and 8 for each auxiliary nozzle 5, 6 in order to achieve the regulation of the flow-through aperture.

According to the invention the auxiliary nozzles 5 and 6 are fastened on the loom frame 9 while the main nozzle 4, as illustrated by figure 1, can be preferably moved with the sley 10 and is secured to this end, for instance, on the sley end 11. According to an alternative solution of the invention the main nozzle 4 can also be fastened on the loom frame 9. According to an embodiment which is not illustrated by the figures this main nozzle 4 can also be foreseen for an adjustable flow-through aperture for the supplied medium.

Moreover figure 1 is also illustrating the com-

pressed air connections 12 to 14 and the supply lines 15 to 17 of the two auxiliary nozzles 5 and 6 and of the main nozzle 4 respectively. Possibly some of these compressed air connections may be common to different nozzles. The weft threads 1 and 2 can be unwound for instance by unwounding coils respectively 18 and 19.

The adjustments of the flow-through aperture of the auxiliary nozzles 5 and 6 are possibly of the main nozzle 4 as well as the driving means and, mainly, the driving means 7 and 8 will still be described more in detail with reference to figures 2 and 7 where these nozzles are illustrated.

As also illustrated by figure 1 the device in accordance with the invention and more specifically the driving means 7 and 8 are controlled by means of a control unit 20 which is carrying out the control in accordance with the measurements made on the weft threads 1 and 2 during the insertion into the shed 3. The control can be carried out according to already well known methods. According to figure 1 the measurements are carried out by means of detectors 21 which are located in the shed 3 and of a weft controller 22, whereby they are all connected to the control unit 20. However the measurements carried out by the detectors 21 and 22 can also be achieved by measuring on winding coils 18 and 19.

The functioning of the device according to figure 1 can be for instance as follows. Each auxiliary nozzle, respectively 5 and 6 is regulated in such a way that the corresponding weft thread, respectively 1 and 2 can be introduced into the shed 3 on a nearly ideal way. According to the measurements which are carried out by means of the detectors 21 and 22 the control unit 20 is achieving the regulation of the flow-through aperture of the auxiliary nozzles 5 and 6. The complementary adjustements can be based here, for instance, on the measurement results from the previous insertion of the same kind of weft threads. Preferably the adjustement of the flow-through aperture can be also carried out in accordance with the average of several measurements which were carried out on the same weft threads 1 or 2. The functioning of the device according to the invention can also be combined with other already known control systems for all nozzles of a weaving loom either moving or not moving whereby for instance the switching on times and the pressures in the supply lines 15 to 17 can also be adjusted.

As illustrated by figures 2 to 7 several nozzles having an adjustable flow-through aperture 23 for the supplied medium can now be described as they are specially suitable for the device reported hereabove and more specifically with the construction illustrated by figure 1, designed first for the auxiliary nozzles 5 and 6, but which may also be applied for the main nozzle 4. The nozzles illustrated here are mainly composed of a thread supply pipe 24, a supply channel 26 surrounded by a casing 25 and located concentrically around it for the jet medium and mixing pipe or a jet pipe 27 located in the continuation of the thread supply pipe 24 whereby the supply channel 26 is discharging between the end 28 of the thread supply pipe 24 and the mixing pipe 27.

In the embodiment according to figure 2 the thread supply pipe 24 is actually slideably movable in the casing 25. To this end the rear part 29 of the thread supply pipe 24 is designed in such a way that it can be located exactly in the axial hole 30 of the casing 25. The front part 31 forms also a restriction in order to form the concentric supply channel 26. In order to keep the front part 31 and more specially the end 28 of the thread supply pipe 24 always perfectly in the center of the hole 30, guiding elements are mounted on the outside wall of the front part 31 which can co-operate with the inside wall of the hole 30, as they are composed, for instance, of teeth 32 as illustrated by figure 3. The driving means which must achieve the regulation of the flow-through aperture 23 and which are indicated on figure 1 by respectively reference numbers 7 and 8, are composed, as illustrated by figure 2, of a lever mechanism 33 which is connected on the one hand with the thread supply pipe 24 and which is controlled on the other hand by means of a control motor 34, for instance, by means of a worm shaft 35 and of sliding block 36.

Figure 4 illustrates an alternative solution, whereby the thread supply pipe 24 is actually movable by means of a nut 37 locked against axial movement and which can co-operate with the threading 38 existing on the thread supply pipe 24, whereby nut 37 can be rotated by means of the control motor 34. To this end this nut 37 has on its outside surface a cylindrical surface 39 whereon a belt 40 is guided and driven by means of a driving wheel 41 connected to the motor 34.

The thread supply pipe 24 is locked against rotation by means of a pin 42 or similar which is secured in the casing 25 and which is engaging into an axially extending groove 43 which is made in the thread supply pipe 24.

The functioning of the embodiments according to figure 2 and 4 results from the more or less marked restriction of the flow through aperture 23 caused by the axial displacement of the thread supply pipe 24.

Figure 6 illustrates an alternative solution, whereby the thread supply pipe 24 and the casing 25 are foreseen with teeth, respectively, in the two successive sections 44 and 45 in axial direction, i.e. namely the teeth 32 reported hereabove and the teeth 46 which are both extending in the supply channel 26 whereby they are disposed near each other along one of their side faces. The thread supply pipe 24 is locked against axial displacement and can only carry out a rotation movement. Therefore the thread supply pipe 24 can undergo small angular modifications which are controlled by means of the control motor 34 and of a gear transmission 47.

The functioning of the embodiment according to figure 6 results from the rotation of the teeth 32 and 46 towards each other which modifies the

size of the flow-through aperture 23 as illustrated by figure 7.

Possibly, as illustrated by figure 2, the driving means 7 or 8 may also be foreseen with end stops 48. This end stops 48 make possible, for instance by means of additional driving means not illustrated on the figures, to bring the regulation for a short time in one of the extreme positions thus in co-operation with an end stop 48. This way, if a detector 21, for instance, states that a weft thread 1 or 2 is too slowly moving into the shed 3, it is still possible to act on the same weft thread by instantaneously completely opening the flow-through aperture 23 for a short time in order to still accelerate the weft thread involved.

Figure 8 illustrates still another embodiment whereby, instead of the thread supply pipe 24, the mixing pipe 27 is axially movable in the casing 25. The displacement can be obtained for instance by means of the driving means 7—8 as already described by the embodiment of figure 4 which is not applied to the mixing pipe 27, i.e. by the co-operation of nut 37 and of threading 38 which is now foreseen on the mixing pipe 27. Moreover the corresponding elements of the driving means 7—8 have the same reference numbers of figure 8 as on figure 4. On the other hand the thread supply pipe 24 can be adjusted to an average value of the flow-through aperture 23 by means of a rough regulation achieved with the adjusting screw 49 and then locked by a locking screw 50.

The embodiment according to figure 8 offers mainly two advantages towards the case of figure 4. As a relatively large dust formation is occuring at the place of the thread supply into the thread supply pipe, the driving means 7—8 according to figure 4 must have a dust tight construction. With a regulation whereby the driving means 7—8 are located at some distance of the dust source, as it is the case on figure 8, advantage is taken from the fact that no precautions must be taken against dust penetration. The second advantage results from the fact that the mixing pipe 27 is better guided in the hole 30 than part 31 of the thread supply pipe 24 because contact is achieved with the full outside surface of the casing 25. Consequently, in the case of axial movement, no displacement of the centre can occur, caused for instance by tolerance errors while it is well the case with the free end 28 of the threads supply pipe 24.

The present invention is by no means limited to the examples described hereabove and to the embodiments illustrated by the figures but this device for the insertion of weft threads into the shed of weaving looms as well as the adjustable nozzles used to this end can be designed according to various alterantive solutions without leaving the scope of this invention.

Claims

1. Device for the insertion of weft threads into the shed of an air jet loom, comprising the combination of a main nozzle (4) and at least one auxiliary nozzle (5, 6) the latter being mounted on a stationary part of the loom upstream of the main nozzle (4), characterised in that the auxiliary nozzle, or at least one of the auxiliary nozzles (5, 6), has an adjustable flow-through aperture (23) and driving means in order to achieve the adjustment of the flow-through aperture (23), the driving means being controlled by means of a control unit (20) in accordance with the kind of weaving thread used and/or in relationship with the measurements carried out on the weft threads during its insertion into the shed.

2. Device according to claim 1, characterised in that the main nozzle (4) has an adjustable flow-through aperture (23) for the supplied medium as well as driving means to achieve its adjustment.

3. Device according to claim 1 or 2, characterised in that the main nozzle (4) is secured on the sley (10).

4. Device according to claim 1 or 2, characterised in that the main nozzle (4) is secured on the loom frame (9).

5. Device according to one of the previous claims, characterised in that the driving means (7, 8) for the adjustment of the flow-through apertures (23) of at least the auxiliary nozzles (5, 6) are controlled by a control unit (20) which is performing the control in accordance with the measurements carried out on the weft threads (1, 2) during the insertion into the shed (3).

6. Device according to one of the previous claims whereby the auxiliary nozzles (5, 6) and/or the main nozzle (4) are mainly composed of a thread supply pipe (24), of a supply channel (26) for the jet medium surrounded by a casing (25) and located concentrically around it and of a mixing pipe (27) located in the continuation of the thread supply pipe (24) whereby the supply channel (26) is terminating between the end (28) of the thread supply pipe (24) and the mixing pipe (27), characterised in that in order to adjust the flow-through aperture (23) for the supplied medium, the thread supply pipe (24) and/or the mixing pipe (27) are axially movable towards each other.

7. Device according to claim 6, characterised in that the driving means (7, 8) to achieve the adjustment of the flow-through aperture (23) are mainly composed of a lever mechanism (33) connected to the thread supply pipe (24) and/or to the mixing pipe (27) and of a control motor (34) to control the lever mechanism (33).

8. Device according to claim 6, characterised in that the driving means (7, 8) to achieve the adjustment of the flow-through aperture (23) are mainly composed of a nut (37) locked against axial movement and which can co-operate with a threading (38) located on the thread supply pipe (24) and/or the mixing pipe (27) and of a control motor (34) to drive the nut (37).

9. Device according to one of claims 1 to 5, whereby the auxiliary nozzles (5, 6) and/or the main nozzle (4) are mainly composed of a thread supply pipe (24) and of a supply channel (26) for the medium surrounded by a casing (25) and

located concentrically around it and of a mixing pipe (27) located in the continuation of the thread supply pipe (24) whereby the supply channel (26) for the medium is terminating between the end (28) of the thread supply pipe (24) and the mixing pipe (27), characterised in that the thread supply pipe (24) and the casing (25) are forseen with teeth (32, 46) respectively in two successive sections (44, 45) in axial direction and which are extending into the supply channel (26) of the medium whereby these sections are located near each other along one of their side faces and whereby the thread supply pipe (24) is at least the casing (25) are mutually rotatable with respect to each other.

10. Device according to claim 9, characterised in that the thread supply pipe (24) is rotatable by means of a control motor (34).

11. Adjustable nozzle for airjet weaving looms, which is mainly composed of a thread supply pipe (24), of a supply channel (26) for the jet medium surrounded by a casing (25) and located concentrically around the thread supply pipe (24), and of a mixing pipe (27) located in the continuation of the thread supply pipe (24), whereby the supply channel (26) is terminating between the end (28) of the thread supply pipe (24) and the mixing pipe (27), characterised in that in order to adjust the flow-through aperture (23) for the supplied medium, the thread supply pipe (24) and/or the mixing pipe (27) are axially movable towards each other.

12. Adjustable nozzle according to claim 11, characterized in that is comprises driving means (7, 8) to achieve the adjustment of the flow-through aperture (23), these driving means (7, 8) are mainly composed of a lever mechanism (33) connected to the thread supply pipe (24) and/or to the mixing pipe (27) and of a control motor (34) to control the lever mechanism (33).

13. Adjustable nozzle according to claim 11, characterised in that it comprises driving means (7, 8) to achieve the adjustment of the flow-through aperture (23), these driving means (7, 8) are mainly composed of a nut (37) locked against axial movement which can cooperate with a threading (38) located on the thread supply pipe (24) and/or on the mixing pipe (27), and of a contrl motor (34) to drive the nut (37).

14. Adjustable nozzle for air jet weaving looms, which is mainly composed of a thread supply pipe (24) and of a supply channel (26) for the medium surrounded by a casing (25) and located concentrically around it, and of a mixing pipe (27) located in the continuation of the thread supply pipe (24), whereby the supply channel (26) for the medium is terminating between the end (28) of the thread supply pipe (24) and the mixing pipe (27), characterised in that the thread supply pipe (24) and the casing (25) are provided with teeth (32, 46) respectively in two successive sections (44, 45) in axial direction, whereby these teeth (32, 46) are extending into the supply channel (26) of the medium, and whereby these sections (44, 45) are located near each other along one of their side faces, and whereby the thread supply pipe (24) and at least the casing (25) are rotatable with respect to each other.

15. Adjustable nozzle according to claim 14, characterised in that the thread supply pipe (24) is rotatable by means of a control motor (34).

Patentansprüche

1. Eine Vorrichtung zum Entragen eines Schußfadens in das Fach einer Luftdüsenwebmaschine, bestehend aus der Kombination einer Hauptdüse (4) und mindestens einer Hilfsdüse (5, 6), wobei letztere stromaufwärts von der Hauptdüse (4) an einem unbeweglichen Teil der Webmaschine befestigt ist, gekennzeichnet dadurch, daß die Hilfsdüse oder mindestens eine der Hilfsdüsen (5, 6) eine regulierbare Durchströmöffnung (23) besitzt, sowie Antriebsmittel, um die Regulierung der Durchströmöffnung (23) herbeizuführen, wobei die Antriebsmittel durch die Mittel einer Steuereinheit (20) gesteuert werden, in Übereinstimmung mit der Art des verwendeten Webfadens und/oder in Verbindung mit den Messungen, die an den Webfäden während ihres Eintrags in das Fach ausgeführt werden.

2. Die Vorrichtung gemäß Anspruch 1, gekennzeichnet dadurch, daß die Hauptdüse (4) eine regulierbare Durchströmöffnung (23) für das zugeführte Medium besitzt, sowie Antriebsmittel, um seine Regulierung herbeizuführen.

3. Die Vorrichtung gemäß Anspruch 1 oder 2, gekennzeichnet dadurch, daß die Hauptdüse (4) auf der Lade (10) befestigt ist.

4. Die Vorrichtung gemäß Anspruch 1 oder 2, gekennzeichnet dadurch, daß die Hauptdüse (4) am Webmaschinengestell (9) befestigt ist.

5. Die Vorrichtung gemäß einem der vorgenannten Ansprüche, gekennzeichnet dadurch, daß die Antriebsmittel (7, 8) für die Regulierung der Durchströmöffnungen (23) von zumindest den Hilfsdüsen (5, 6) von einer Steuereinheit (20) gesteuert werden, die die Steuerung in Übereinstimmung mit den Messungen ausführt, die an den Schußfäden (1, 2) während des Eintrags in das Fach (3) ausgeführt werden.

6. Die Vorrichtung gemäß einem der vorgenannten Ansprüche, wobei die Hilfsdüsen (5, 6) und/oder die Hauptdüse (4) im wesentlichen aus einem Fadenzufuhrrohr (24), einem Zufuhrkanal (26) für das Düsenmedium, umgeben von einem Gehäuse (25) und konzentrisch darum angeordnet, und einem Mischrohr (27), das in der Verlängerung des Fadenzufuhrrohrs (24) angeordnet ist, besteht, wobei der Zufuhrkanal (26) zwischen dem Ende (28) des Fadenzufuhrrohrs (24) und dem Mischrohr (27) endet, gekennzeichnet dadurch, daß, um die Durchströmöffnung (23) für das zugeführte Medium zu regulieren, das Fadenzufuhrrohr (24) und/oder das Mischrohr (27) axial aufeinander zubewegt werden.

7. Die Vorrichtung gemäß Anspruch 6, gekennzeichnet dadurch, daß die Antriebsmittel (7, 8), um die Regulierung der Durchströmöffnung (23) herbeizuführen, im wesentlichen aus einem

Hebelmechanismus (33) bestehen, der mit dem Fadenzufuhrrohr (24) und/oder dem Mischrohr (27) verbunden ist, sowie einem Steuermotor (34) zur Steuerung des Hebelmechanismus (33).

8. Die Vorrichtung gemäß Anspruch 6, gekennzeichnet dadurch, daß die Antriebsmittel (7 8), um die Regulierung der Durchströmöffnung (23) herbeizuführen, im wesentlichen aus einer Mutter (37) bestehen, die gegen axiale Bewegung gesperrt ist und die mit einem Gewinde (38) zusammenarbeiten kann, das sich am Fadenzufuhrrohr (24) und/oder am Mischrohr (27) befindet, sowie einem Steuermotor (34) für den Antrieb der Mutter (37).

9. Die Vorrichtung gemäß einem der Ansprüche 1 bis 5, wobei die Hilfsdüsen (5, 6) und/oder die Hauptdüse (4) im wesentlichen aus einem Fadenzufuhrrohr (24) und einem Zufuhrkanal (26) für das Düsenmedium, umgeben von einem Gehäuse (25) und konzentrisch darum angeordnet, und einem Mischrohr (27), in der Verlängerung des Fadenzufuhrrohrs angeordnet, bestehen, wobei der Zufuhrkanal (26) zwischen dem Ende (28) des Fadenzufuhrrohrs (24) und dem Mischrohr (27) endet, gekennzeichnet dadurch, daß das Fadenzufuhrrohr (24) und des Gehäuse (25) jeweils in zwei aufeinanderfolgenden Abschnitten (44, 45) in axialer Richtung mit Zähnen versehen sind, die sich in den Zufuhrkanal (26) des Mediums fortsetzen, wobei diese Abschnitte nahe beieinander entlang einer ihrer Seitenflächen angeordnet sind und wobei das Fadenzufuhrrohr (24) und mindestens auch das Gehäuse (25) im Hinblick zueinander rotierbar sind.

10. Die Vorrichtung gemäß Anspruch 9, gekennzeichnet dadurch, daß das Fadenzufuhrrohr (24) mittels eines Steuermotors (34) rotierbar ist.

11. Eine regulierbare Düse für Luftdüsenwebmaschinen, die im wesentlichen aus einem Fadenzufuhrrohr (24), einem Zufuhrkanal (26) für das Düsenmedium, umgeben von einem Gehäuse (25) und konzentrisch darum angeordnet, und einem Mischrohr (27), das in der Verlängerung des Fadenzufuhrrohrs (24) angeordnet ist, besteht, wobei der Zufuhrkanal (26) zwischen dem Ende (28) des Fadenzufuhrrohrs (24) und dem Mischrohr (27) endet, gekennzeichnet dadurch, daß, um die Durchströmmöffnung (23) für das zugeführt Medium um regulieren, das Fadenzfuhrrohr (24) und/oder das Mischrohr (27) axial zueinander beweglich sind.

12. Die regulierbare Düse gemäß Anspruch 11, gekennzeichnet dadurch, daß sie Antriebsmittel (7, 8) besitzt, um die Regulierung der Durchströmöffnung (23) herbeizuführen wobei diese Antribesmittel (7, 8) im wesentlichen aus einem Hebelmechanismus (33) bestehen der mit dem Fadenzufuhrrohr (24) und/oder dem Mischrohr (27) verbunden ist, sowie aus einem Steuermotor (34) zur Steuerung des Hebelmechanismus (33).

13. Die regulierbare Düse gemäß Anspruch 11, gekennzeichnet dadurch, daß sie Antriebsmittel (7, 8) besitzt, um die Regulierung der Durchströmöffnung (23) herbeizuführen, wobei diese Antriebsmittel (7, 8) im wesentlichen aus einer Mutter (37) bestehen, die gegen axiale Bewegung gesperrt ist und die mit einem Gewinde (38) zusammenarbeiten kann, das sich am Fadenzufuhrrohr (24) und/oder am Mischrohr (27) befindet, sowie aus einem Steuermotor (34) zum Antrieb der Mutter (37).

14. Die regulierbare Düse Luftdüsenwebmaschinen, die im wesentlichen aus einem Fadenzufuhrrohr (24) und einem Zufuhrkanal (26) für das Medium besteht, umgeben von einem Gehäuse (25) und konentrisch um dieses angeordnet, sowie aus einem Mischrohr (27), das in der Verlängerung des Fadenzufuhrrohrs (24) angebracht ist, wobei der Zufuhrkanal (26) dür das Medium zwischen dem Ende (28) des Fadenzufuhrrohrs (24) und dem Mischrohr (27) endet, gekennzeichnet dadurch, daß das Fadenzufuhrrohr (24) und das Gehäuse (25) jeweils in zwei aufeinanderflogenden Abschnitten (44, 45) in axialer Richtung mit Zähnen versehen sind, die sich in den Zufuhrkanal (26) des Mediums fortsetzen, wobei diese Abschnitte (44, 45) nahe beieinander entlang einer ihrer Seitenflächen angeordnet sind und wobei das Fadenzufuhrrohr (24) und mindestens auch das Gehäuse (25) im Hinblick zueinander rotierbar sind.

15. Die regulierbare Düse gemäß Anspruch 14, gekennzeichnet dadurch, daß das Fadenzufuhrrohr (24) mittels eines Steuermotors (34) rotierbar ist.

Revendications

1. Dispositif destiné à l'insertion de fils de trame dans la foule d'une machine à tisser à jet d'air, comprenant la combinaison d'une buse principale (4) et d'au moins une buse secondaire (5, 6); cette dernière est montée sur une partie fixe de la machine à tisser, en amont de la buse principale (4); ce dispositif est caractérisé par le fait que la buse secondaire ou au moins une des buses secondaires (5, 6) possède un orifice de passage réglable (23) et des moyens d'entraînement destinés à réaliser le réglage de l'orifice de passage (23); ces moyens d'entraînement sont commandés par une unité de commande (20) en fonction du type de fil de trame utilisé et/ou selon des mesures effectuées sur le fil de trame pendant son insertion dans la foule.

2. Dispositif selon la revendication 1, caractérisé par le fait que le buse principale (4) possède un orifice de passage réglable (23) pour le fluide d'alimentation ainsi que des moyens d'entraînement pour réaliser ce réglage.

3. Dispositif selon les revendications 1 ou 2, caractérisé par le fait que la buse principale (4) est fixée sur le battant (10).

4. Dispositif selon les revendications 1 ou 2, caractérisé par le fait que la buse principale (4) est fixée sur le bâti de la machine à tisser (9).

5. Dispositif selon l'une des revendications précédentes, caractérisé par le fait que les moyens d'entraînement (7, 8) destinés au réglage

des orifices de passage (23) des buses secondaires (5, 6) au moins, sont commandés par une unité de commande (20) réalisant cette commande selon les mesures effectuées sur les fils de trame (1, 2) pendant leur insertion dans la foule (3).

6. Dispositif selon l'une des revendications précédentes, dans lequel les buses secondaires (5, 6) et/ou la buse principale (4) sont composées principalement d'une buse de fourniture de fil (24), d'un canal d'alimentation (26) pour le fluide d'alimentation place concentriquement autour de celle-ci et entouré d'une éveloppe (25), ainsi que d'une buse de mélange (27) placée dans le prolongement de la buse de fourniture de fil (24), le canal d'alimentation (26) débouchant entre l'extrémité (28) de la buse de fourniture de fil (24) et de la buse de mélanga (27); ce dispositif est caractérisé par le fait qu'en vue du réglage de l'orifice de passage (23) pour le fluide d'alimentation, la buse de fourniture de fil (24) et/ou la buse de mélange (27) peuvent se mouvoir l'une vers l'autre dans le sens axial.

7. Dispositif selon la revendication 6, caractérisé par le fait que les moyens d'entraînement (7, 8) assurant le régulation de l'orifice de passage (23) sont composés principalement d'un mechanism à levier (33) connecté à la buse de fourniture de fil (24) et/ou à la buse de mélange (27) et d'un moteur de commande (34) commandant le mécanisme à levier (33).

8. Dispositif selon la revendication 6, caractérisé par le fait que les moyens d'entraînement (7, 8) assurant la régulation de l'orifice de passage (23) sont composés principalement d'un écrou (37) bloqué dans le sens axial et pouvant interagir avec un filetage (38) pratiqué sur la buse de fourniture de fil (24) et/ou la buse de mélange (27), l'écrou (37) pouvant être mis en mouvement rotatif par un moteur de commande (34).

9. Dispositif selon l'une des revendications 1 à 5, dans lequel les buses secondaires (5, 6) et/ou la buse principale (4) sont composées essentiellement d'une buse de fourniture de fil (24), d'un canal d'alimentation (26) pour le fluide placé concentraiquement autour de celle-ci et entouré d'une enveloppe (25), ainsi que d'une buse de mélange (27) placée dans le prolongement de la buse de fourniture de fil (24); le canal d'alimentation (26) pour le fluide débouche entre l'extrémité (28) de la buse de fourniture de fil (24) et de la buse de mélange (27); ce dispositif est caractérisé par le fait que la buse de fourniture de fil (24) et l'enveloppe (25) sont pourvues d'ailettes (32, 46) placées dans le sens axial dans les deux sections successives (44, 45), respectivement; ces ailettes se prolongent dans le canal d'alimentation (26) du fluide, où ce sections viennent se placer les unes à côté des autres le long de l'une de leurs faces latérales; la buse de fourniture de fil (24) et au moins l'enveloppe (25) peuvent tourner l'une par rapport à l'autre.

10. Dispositif selon la revendication 9, caractérisé par le fait que la buse de fourniture de fil (24) peut tourner sous l'action d'un moteur de commande (34).

11. Buse réglable pour machines à tisser à jet d'air, composée principalement d'une buse de fourniture de fil (24), d'un canal d'alimentation (26) pour le fluide d'alimentation placé concentriquement autour de la buse de fourniture de fil (24) et entouré d'une enveloppe (25), ainsi que d'une buse de mélange (27) placée dans le prolongement de la buse de fourniture de fil (24); de canal d'alimentation (26) débouche entre l'extrémité (28) de la buse de fourniture de fil (24) et de la buse de mélange (27); cette buse réglable est caractérisée par le fait qu'en vie du réglage de l'orifice de passage (23) du fluide d'alimenation, la buse de fourniture de fil (24) et/ou la buse de mélange (27) peuvent se déplacer l'une vers l'autre dans le sens axial.

12. Buse réglable selon la revendication 11, caractérisée par le fait qu'elle possède des moyens d'entraînement (7, 8) assurant la régulation de l'orifice de passage (23); ce moyens d'entraînement (7. 8) sont composés principalement d'un mécanisme à levier (33) connecté à la buse de fourniture de fil (24) et/ou à la buse de mélange (27) et d'un moteur de commande (34) commandant le mécansime à levier (33).

13. Buse réglable selon la revendication 11, caractérisée par le fait qu'elle possède des moyens d'entraînement (7, 8) assurant la régulation de l'orifice de passage (23); ces moyens d'entraînement (7, 8) sont composés principalement d'un écrou (37) bloqué dans le sens axial et pouvant interagir avec un filetage (38) pratiqué sur la buse de fourniture de fil (24) et/ou la buse de mélange (27), l'écrou (37) pouvant être mis en mouvement rotatif par un moteur de commande (34).

14. Buse réglable pour machines à tisser à jet d'air, composée principalement d'une buse de fourniture de fil (24), d'un canal d'alimentation (26) pour le fluide placé concentriquement autour de celle-ci et entouré d'une enveloppe (25) ainsi que d'une buse de mélange (27) placée dans le prolongement de la buse de fourniture de fil (24); le canal d'alimentation (26) pour le fluide débouche entre l'extrémité (28) de la buse de fourniture de fil (24) et de la buse de mélange (27); cette buse réglable est caractérisée par le fait que la buse de fourniture de fil (24) et l'enveloppe (25) sont pourvues d'ailettes (32, 46) placées dans le sens axial dans les deux sections successives (44, 45), respectivement; ces ailettes (32, 46) se prolongent dans le canal d'alimentation (26) du fluide, où ces sections (44, 45) viennent se placer les unes à côté des autres le long de l'une de leurs faces latérales; la buse de fourniture de fil (24) et au moins l'enveloppe (25) peuvent tourner l'une par rapport à l'ature.

15. Buse réglable selon la revendication 14, caractérisée par le fait que la buse de fourniture de fil (24) peut tourner sous l'action d'un moteur de commande (34).

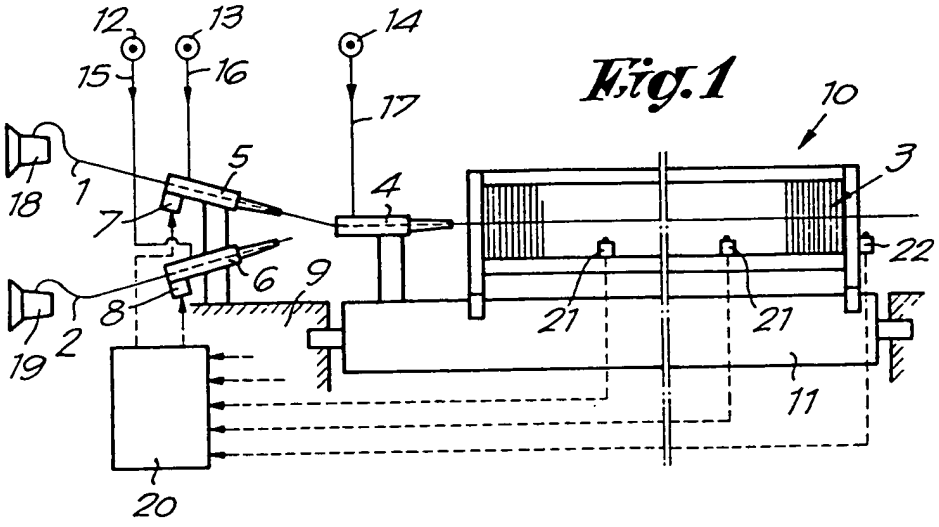

Fig.1

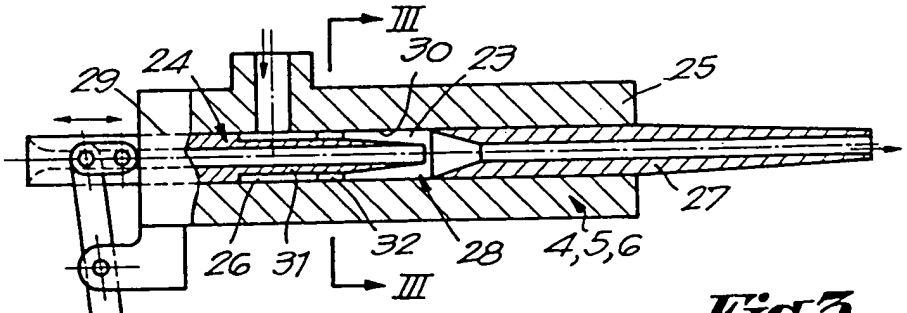

Fig.3

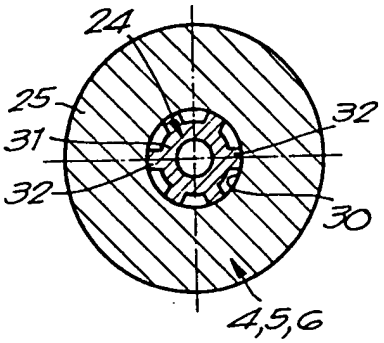

Fig.2

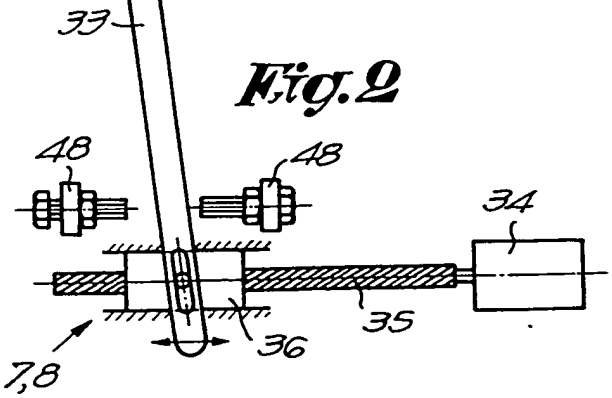

Fig.4

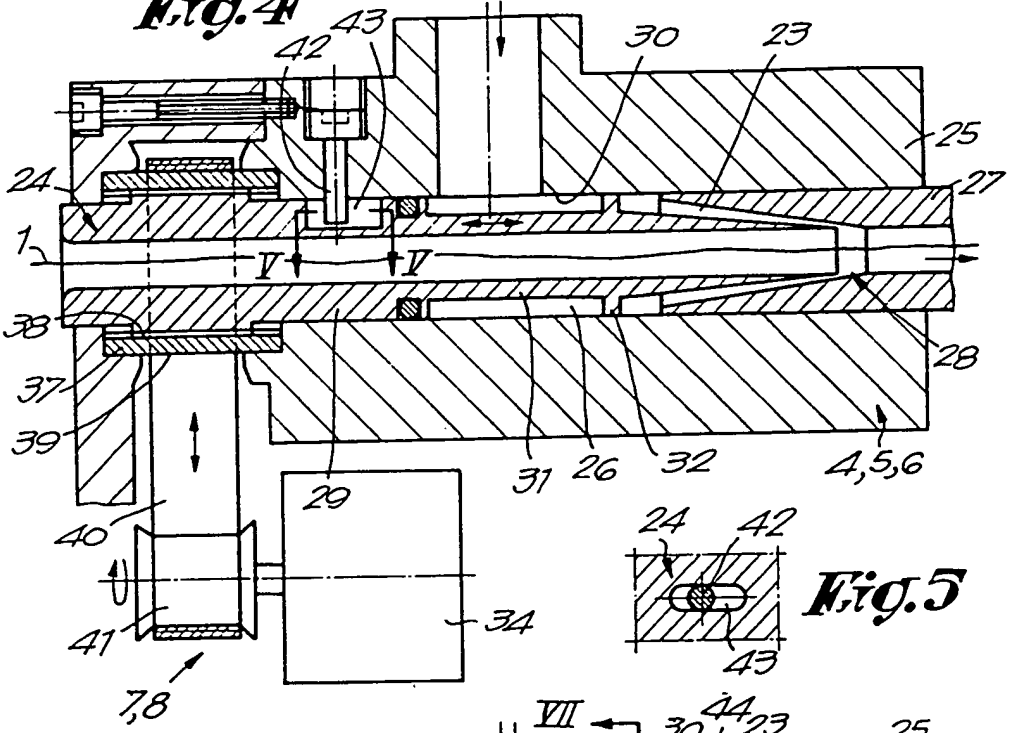

Fig.5

Fig.6

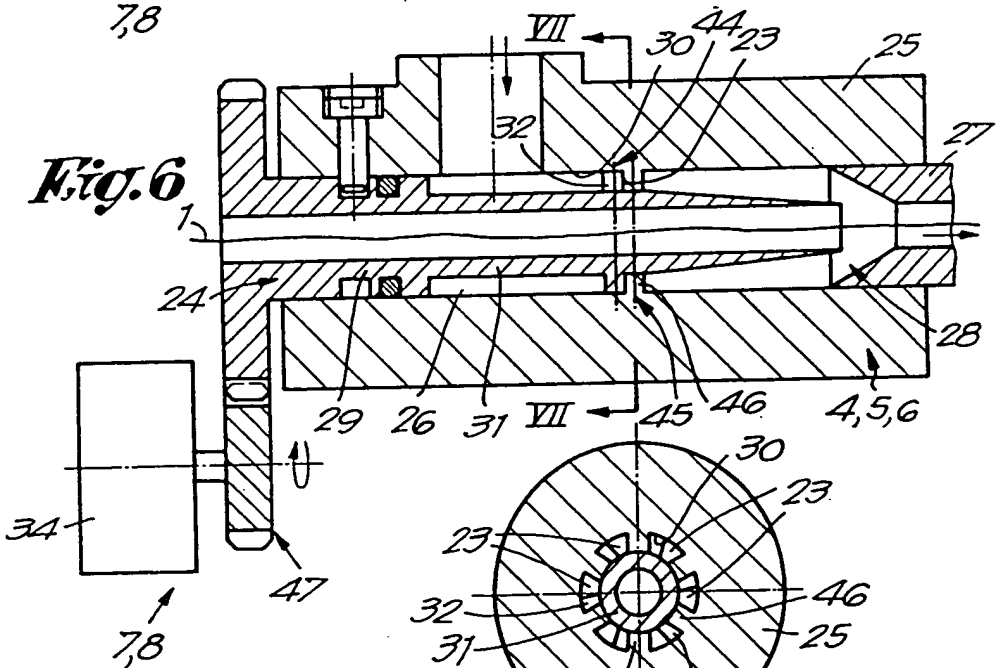

Fig.7

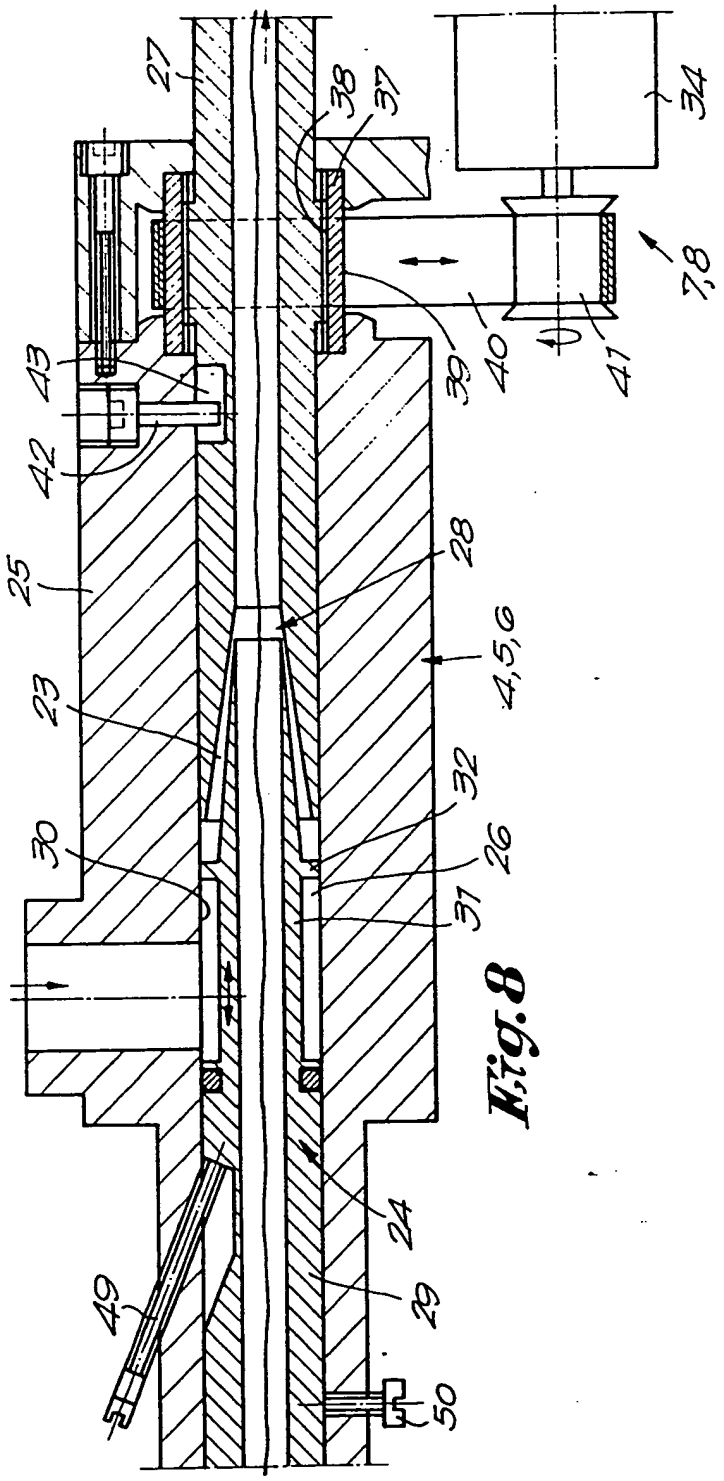

Fig.8